

The state of the muscle after section of its nerves is that of "tonus."

Atropine by acting directly on the unstriated muscular tissue, and paralysing it, can produce a greater dilatation than mere section of the third nerve, and so also on section of the third nerve eserine directly stimulating the muscular fibre gives rise to extreme contraction.

The intra-ocular muscles therefore have a similar anatomical, histological, and physiological action, and they also are associated together during the act of accommodation. The pupil contracts on accommodating, and dilates on relaxation of the ciliary muscle; the former action is by means of the third as motor nerve of the pupillary and ciliary muscles, and the latter is through the long ciliary nerves from the nasal branch of the fifth.

The ordinary light reflex of the pupil takes place by the third, as the motor nerve, and the cervical sympathetic as the inhibitory nerve giving rise to dilatation of the pupil. The two chief actions of the pupillary muscle are thus divided off from one another in mammals. In birds possessing voluntary control over their irides this is not so, and the cervical sympathetic has no power over the pupil, the nerve producing dilatation of the pupil being the trigeminus.

V. "On the Place of Origin of Uric Acid in the Animal Body."

By ALFRED BARING GARROD, M.D., F.R.S. Received June 8, 1886.

(Abstract.)

The endeavour of the author in this communication has been to show the place of origin of uric acid in the animal body, and to ascertain which of the two hypotheses on the subject is correct, viz., whether uric acid is first present in the blood and then secreted from the blood by the kidneys, or whether it is formed by the kidneys themselves. To enable him to satisfactorily prosecute many of his observations, the author has devised a new method for discovering the presence of uric acid in very minute quantities of blood.

The results of his investigations are embodied in the form of the nine following propositions:—

Prop. I.—Uric acid is secreted by the kidneys as ammonium urate, and in the case of birds and reptiles, whose urine is semi-solid, it is found in a definite physical form, more in the vitreous condition than in the truly crystalline shape.

Prop. II.—Uric acid, when present in the blood, is found under the

form of sodium urate, and, when deposited from the blood during life in any tissue, it is also as sodium urate in its characteristic crystalline form.

Prop. III.—The daily quantity of uric acid in relation to their body-weights secreted by different animals varies extremely. In some, as the carnivorous mammalia, the ratio may be less than 1 to 1,000,000, whereas, in others, as birds, it may be as 1 to 85. In man it may be regarded as about 1 to 120,000.

Prop. IV.—The quantity of uric acid contained in the blood of different animals has little relation to that secreted by the kidneys. In birds, secreting daily so large a quantity, the blood is often found to be as free from uric acid as it is in animals whose daily elimination of uric acid is excessively small.

Prop. V.—When uric acid is absorbed from the alimentary canal the blood becomes strongly impregnated, and, in fact, often almost saturated with it, so that its presence is readily discovered by any ordinary test.

Prop. VI.—One cause of the appearance of an unusual quantity of uric acid in the blood of birds in health is the presence of uric acid in the water they drink, and occasionally in their solid food.

Prop. VII.—When uric acid is taken into the stomach of man, or other animals, the secretion of this principle from the kidneys is not increased, although at the time the blood may be rich in it.

Prop. VIII.—Uric acid is found in varying quantities in the blood obtained from different veins in the same animal. It is found in larger quantity in that from the efferent renal veins of birds than in that from the portal afferent, or from the jugular veins; and the same test which freely exhibits uric acid in the blood from the former, often fails to show it at all in that from the latter two.

Prop. IX.—The quantity of uric acid secreted daily by the kidneys of a bird is in close relation to the quantity of nitrogenised food taken during the time.

Having brought forward proofs to confirm these propositions severally, the author draws the following conclusion, viz., that every argument is in favour of the hypothesis that uric acid is formed by the kidney-cells, in the form of ammonium urate, and that the traces of sodium urate ordinarily found in the blood are the result of a necessary absorption, slight in amount, of the ammonium urate from the kidneys into the blood, and its subsequent conversion by that fluid into sodium urate.